

US-PAT-NO: 6684087

DOCUMENT-IDENTIFIER: US 6684087 B1

TITLE: Method and apparatus for displaying images on mobile devices

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Application Filing Date - AD (1):

19990507

Brief Summary Text - BSTX (5):

The Internet is a rapidly growing communication network of interconnected computers and computer networks around the world. Together, these millions of connected computers form a vast repository of multimedia information that is readily accessible by any of the connected computers from anywhere at any time. To navigate the Internet, the connected computers, such as workstations and desktop computers, typically operate what is commonly called "browser", an application (client) program that generally uses the Hypertext Transfer Protocol (HTTP) to make requests to the multimedia information throughout the Internet. These computers capable of operating the browser using HTTP are generally powerful, having sufficient computing resources, such as processing power, memories, display capabilities and user interfaces. When the multimedia information is static image data, only constrained to the local memory, the image data can be downloaded to the computers and then manipulated and displayed. To provide mobility and portability of the Internet, interactive two-way communication mobile devices are introduced and capable of communicating, via wireless data networks, with the Internet. The interactive two-way communication mobile devices, including two-way pagers, cellular phones, palm-sized computing devices and personal digital assistant (**PDA**) apparatuses are among the fastest emerging communication devices introduced recently that enable users to receive, collect, analyze, review and disseminate information as they travel or move about. Contrary to the computers coupled to the Internet, the mobile devices are characterized by thin designs in terms of power consumption and cost constraints that may include less memory, lower processing power, etc. Consequently, displaying images on the mobile devices has been a difficult task. Further, the input interface provided is often limited to a keypad or soft keys that have far fewer available keys than a PC keyboard does. Furthermore, the mobile devices, such as the cellular phones, are often lack of a pointing mechanism as opposed to a mouse coming with nearly every desktop computer. Hence interacting with a displayed image becomes even a more difficult task.

Detailed Description Text - DETX (5):

There are n mobile devices 106 serviced by airnet 102. Mobile devices 106 herein are considered interactive two-way communication devices that include, but are not limited to, mobile computing devices, cellular phones, palm-sized

computing devices with **PDA** (Personal Data Assistants) functionality and Internet-capable appliance remote controllers, and capable of communicating wirelessly with antenna 108 via airnet 102. For simplicity, antenna 108 also represents a wireless carrier infrastructure that generally comprises a base station and an operations and maintenance center. The base station controls radio or telecommunication links with mobile devices 106. The operations and maintenance center comprises a mobile switching center performing the switching of calls between the mobile devices and other fixed or mobile network users. Further the operations and maintenance center manages mobile account services, such as authentication, and oversees the proper operation and setup of the wireless network. Each of the hardware components and processes in carrier infrastructure 108 are known to those skilled in the art and not to be described herein to avoid unnecessarily obscuring aspects of the present invention.

Detailed Description Text - DETX (8):

Each of hardware components in digital cellular phone 200 is known to those skilled in the art, so the hardware components are not described in detail herein. According to one embodiment, compiled and linked processes of the present invention are stored in random access memory (ROM) as a client module and a support module. Upon activation of a predetermined key or key sequences utilizing keypad 204, a physical layer processor in digital cellular phone 200 causes the client module, via a radio transceiver therein, to communicate with link server 114 of FIG. 1. It is generally understood that a computing device equipped with an HTML browser using HTTP can access image data in a network server and download the image data for local display. However, this paradigm is not desirable when the computing device is a thin client, such as a cellular phone 200 of FIG. 2. Current HTTP requires considerable computing power and network bandwidth resources. For example, a request from the computing device to establish a communication session with a network server may require an exchange of a number of data packets. In addition to the resources required to implement HTTP, significant resources must be supported in the computing device to request, **format**, process and display image information. This is not a significant disadvantage in many situations because the computing device, including personal computers and workstations coupled to a network generally has sufficient computing power, memory and display capabilities.

Detailed Description Text - DETX (13):

To facilitate the description of the present invention, the wireless communication protocol is HDTP according to one embodiment. It can be appreciated by those skilled in the art that this particularity does not imply any limitation of the present invention to this exemplary communication protocol. As described above, the wireless communication protocol may be HTTP in which case both landnet 100 and airnet 102 are supporting the same protocol and there is no need to perform data mapping between two protocols. This is a typical case when link server 300 is implemented in one of the server devices on the Internet. Link server 300 further comprises a server module 310 coupled between LCP interface 302 and WCP interface 306. Server module 310, typically loaded in a memory, performs traditional server processing as well as protocol conversion processing from one communication protocol to another communication protocol. In particular, the **protocol conversion processing includes protocol conversion** between HDTP/UDP and HTTP/TCP according to the embodiment.